In the Claims:

Please amend the claims as follows:

1. (Previously Amended) A method for attenuating water layer multiples from a gather of seismic data traces, comprising:

applying a convolutional operator to the gather of seismic data traces to predict a plurality of receiver side water layer multiples contained in the gather of seismic data traces;

adaptively subtracting the receiver side water layer multiples from the gather of seismic data traces to generate a modified version of the gather of seismic data traces;

removing a water bottom primary from the modified version of the gather of seismic data traces to create a second modified version of the gather of seismic data traces;

applying the convolutional operator to the second modified version of the gather of seismic data traces to predict a plurality of source side water layer multiples contained in the gather of seismic data traces; and

adaptively subtracting the receiver side water layer multiples and the source side water layer multiples from the gather of seismic data traces to generate a plurality of primaries contained in the gather of seismic data traces.

2. (Previously Amended) The method of claim 1, wherein applying the convolutional operator to the gather of seismic data traces to predict the plurality of receiver side water layer multiples comprises:

forming the gather of seismic data traces in a t-x domain;

transforming the gather of seismic data traces from the t-x domain to a tau-p domain; and

convolving the gather of seismic data traces with the convolutional operator to predict the receiver side water layer multiples.

3.   (Previously Amended)   The method of claim 1, wherein applying the convolutional operator to the second modified version of the gather of seismic data traces to predict the source side water layer multiples comprises:

convolving the convolutional operator with the second modified version of the gather of seismic data traces to predict the source side water layer multiples.

4.   (Original)   The method of claim 2, wherein the gather of seismic data traces is transformed to the tau-p domain using a linear Radon transform.

5.   (Currently Amended)   The method of claim [2] 1, wherein adaptively subtracting the receiver side water layer multiples and the source side water layer multiples from the gather of seismic data traces comprises:

adding the receiver side water layer multiples to the source side water layer multiples; and

transforming the sum of the receiver side water layer multiples and the source side water layer multiples from the tau-p domain to the t-x domain.

6.   (Previously Amended)   The method of claim 5, wherein adaptively subtracting the receiver side water layer multiples and the source side water layer multiples from the gather of seismic data traces comprises adaptively subtracting the sum of the receiver side water layer multiples and the source side water layer multiples in the t-x domain to generate the primaries contained in the gather of seismic data traces in the t-x domain.

7.   (Previously Amended)   The method of claim 1, wherein removing the water bottom primary comprises replacing each amplitude associated with the water bottom primary with zero.

8.   (Previously Amended)   The method of claim 5, wherein the sum of the receiver side water layer multiples and the source side water layer multiples is transformed to the t-x domain using an inverse linear Radon transform.

9.   (Original)   The method of claim 1, wherein the convolutional operator is computed using a zero offset two-way travel time in a water layer and a reflectivity at a water bottom estimated from the water layer model.

10.   (Original)   The method of claim 9, wherein the convolutional operator is the estimated value of the water bottom reflectivity shifted in time by the estimated value of the travel time in the water layer in the tau-p domain.

11.   (Previously Amended)   A method for attenuating water layer multiples from a gather of seismic data traces, comprising:

forming the gather of seismic data traces in a t-x domain;

transforming the gather of seismic data traces from the t-x domain to a tau-p domain;

convolving the gather of seismic data traces with a convolutional operator to predict a first set of water layer multiples contained in the gather of the seismic data traces;

adaptively subtracting the first set of water layer multiples from the gather of seismic data traces;

removing a water bottom primary from the gather of seismic data traces;

convolving the convolutional operator with the gather of seismic data traces after the first set of water layer multiples has been adaptively subtracted from the seismic data traces and after the water bottom primary has been removed from the gather of seismic data traces to predict a second set of water layer multiples contained in the gather of seismic data traces;

adding the first set of water layer multiples to the second set of water layer multiples;

transforming the sum of the first set of water layer multiples and the second set of water layer multiples from the tau-p domain to the t-x domain; and

adaptively subtracting the transformed sum of the first set of water layer multiples and the second set of water layer multiples from the gather of seismic data traces in the t-x domain to generate a plurality of primaries contained in the gather of seismic data traces.

12.   (Previously Amended)   The method of claim 11, wherein the first set of water layer multiples comprises one or more receiver side water layer multiples.

13.   (Previously Amended)   The method of claim 11, wherein the second set of water layer multiples comprises one or more source side water layer multiples.

14.   (Previously Amended)   The method of claim 11, wherein removing the water bottom primary comprises replacing each amplitude associated with the water bottom primary with zero.

15.   (Previously Amended)   The method of claim 11, wherein the plurality of seismic data traces is transformed to the tau-p domain using a linear Radon transform.

16.   (Previously Amended)   The method of claim 11, wherein the convolutional operator is derived from a water layer model.

17.   (Previously Amended)   The method of claim 11, wherein the convolutional operator is derived from a zero offset two-way travel time in the water layer and reflectivity at a water bottom estimated from a water layer model.

18-20.   Cancelled.

21.   (Previously Presented)   The method of claim 1, wherein the convolutional operator is derived from a water layer model.

22.   (Previously Presented)   The method of claim 17, wherein the convolutional operator is the estimated value of the water bottom reflectivity shifted in time by the estimated value of the travel time in the water layer in the tau-p domain.

23.   (Previously Presented)   A method for attenuating water layer multiples from a gather of seismic data traces, comprising:
        forming the gather of seismic data traces in a t-x domain;
        transforming the gather of seismic data traces to a tau-p domain;

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5

applying a convolutional operator to the gather of seismic data traces to predict a plurality of receiver side water layer multiples contained in the gather of seismic data traces;

adaptively subtracting the receiver side water layer multiples from the gather of seismic data traces to generate a modified version of the gather of seismic data traces;

removing a water bottom primary from the modified version of the gather of seismic data traces to create a second modified version of the gather of seismic data traces;

applying the convolutional operator to the second modified version of the gather of seismic data traces to predict a plurality of source side water layer multiples contained in the gather of seismic data traces;

adding the receiver side water layer multiples to the source side water layer multiples;

transforming the sum of the receiver side water layer multiples and the source side water layer multiples from the tau-p domain to a t-x domain; and

adaptively subtracting the receiver side water layer multiples and the source side water layer multiples from the gather of seismic data traces to generate a plurality of primaries contained in the gather of seismic data traces.

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6

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